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FPT POLYTECHNIC

cdio™

Conceive Design Implement Operate

BASIC RESTFUL API

GIẢNG VIÊN: NGUYỄN NGHIỆM

www.poly.edu.vn

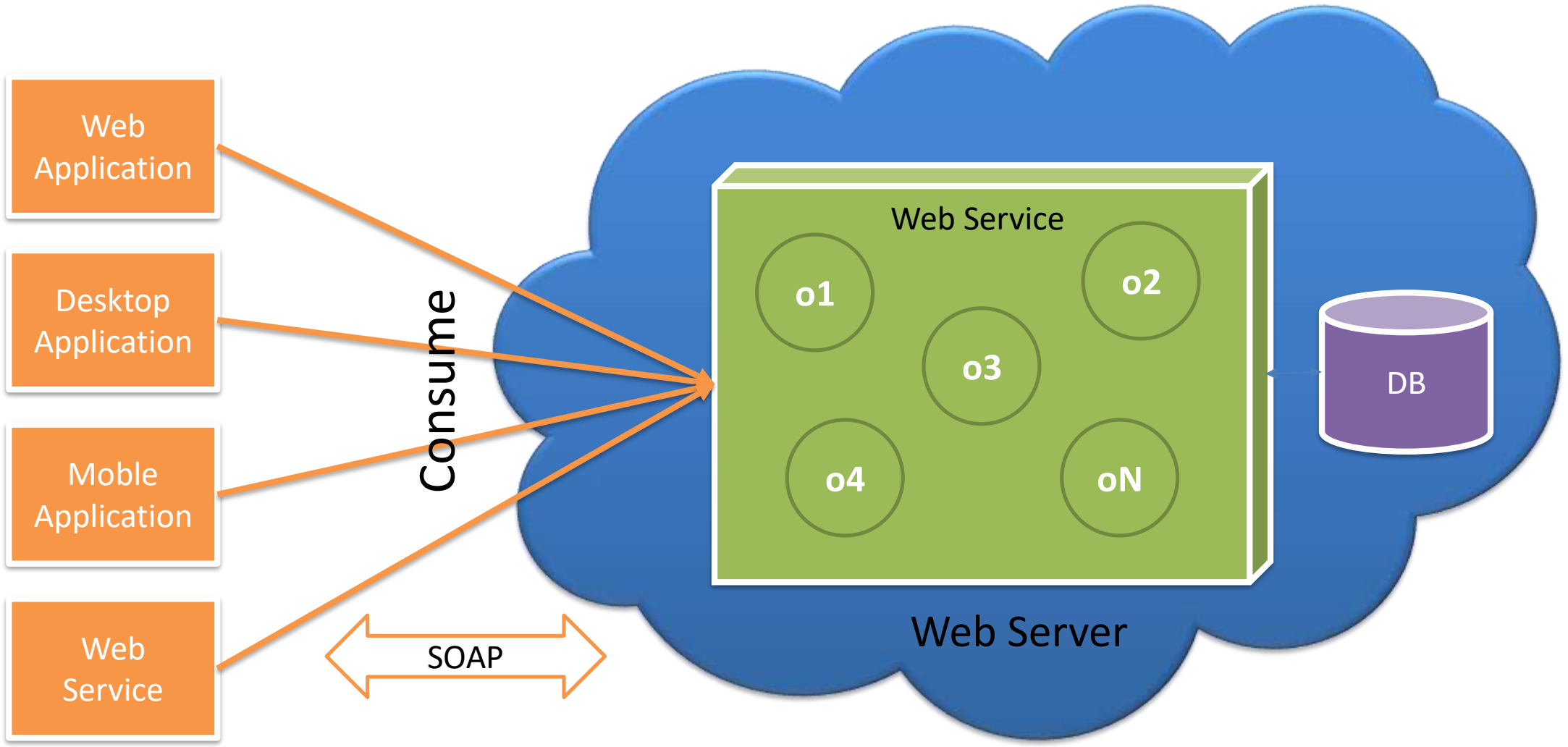
AGENDA

- Web Service & REST API
- Firebase REST API
- Consume REST API with Postman
- Consume REST API with AngularJS
- Consume REST API with java.net.URL
- Consume REST API with RestTemplate

Web Service


Web Service
Java
PHP
C
.net
10:05

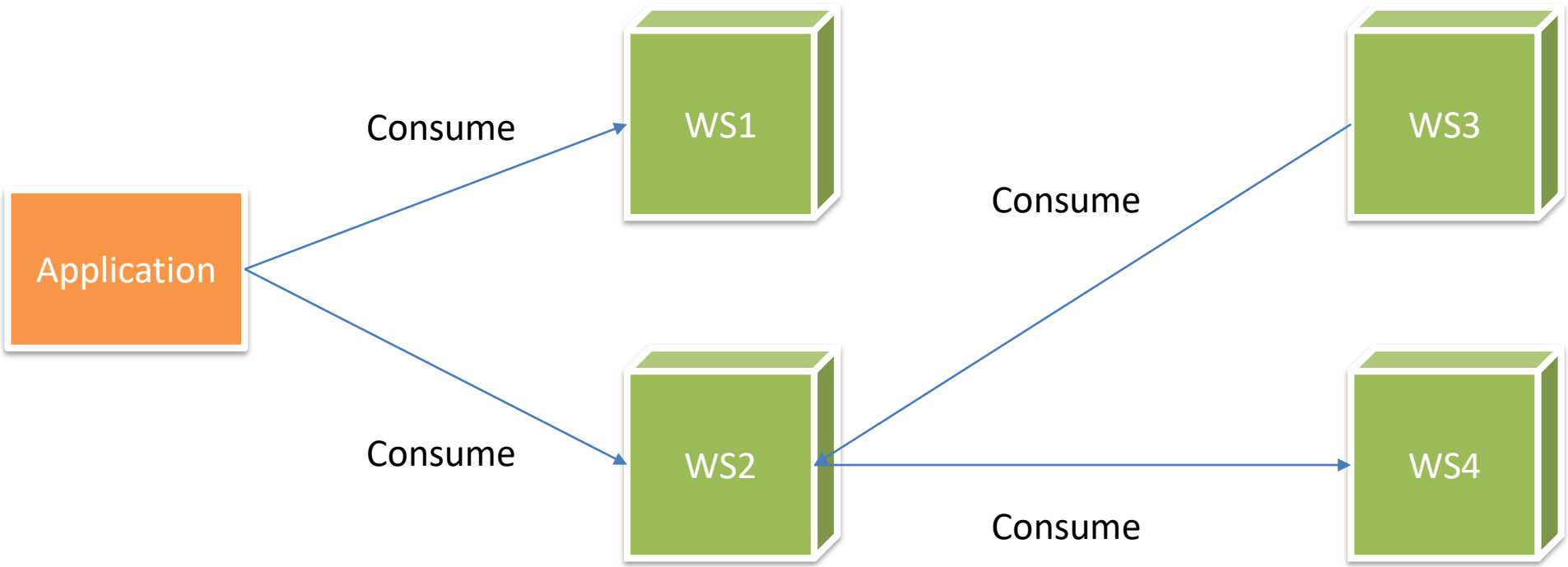
WEB SERVICE



Web Service Consumers

Web service operations là các phương thức cho phép các ứng dụng sử dụng qua web

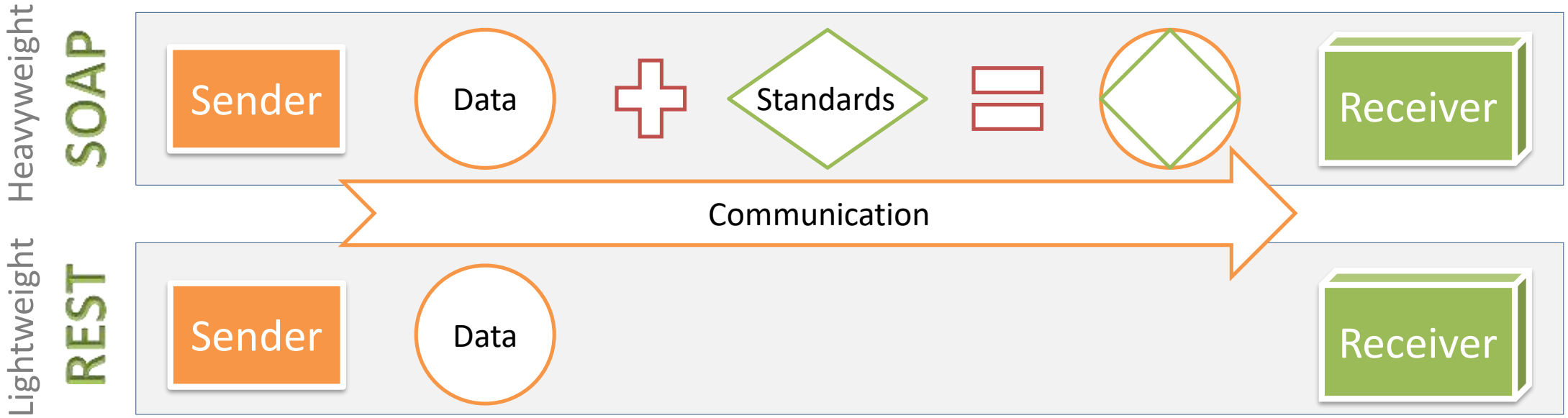
Collaboration Model



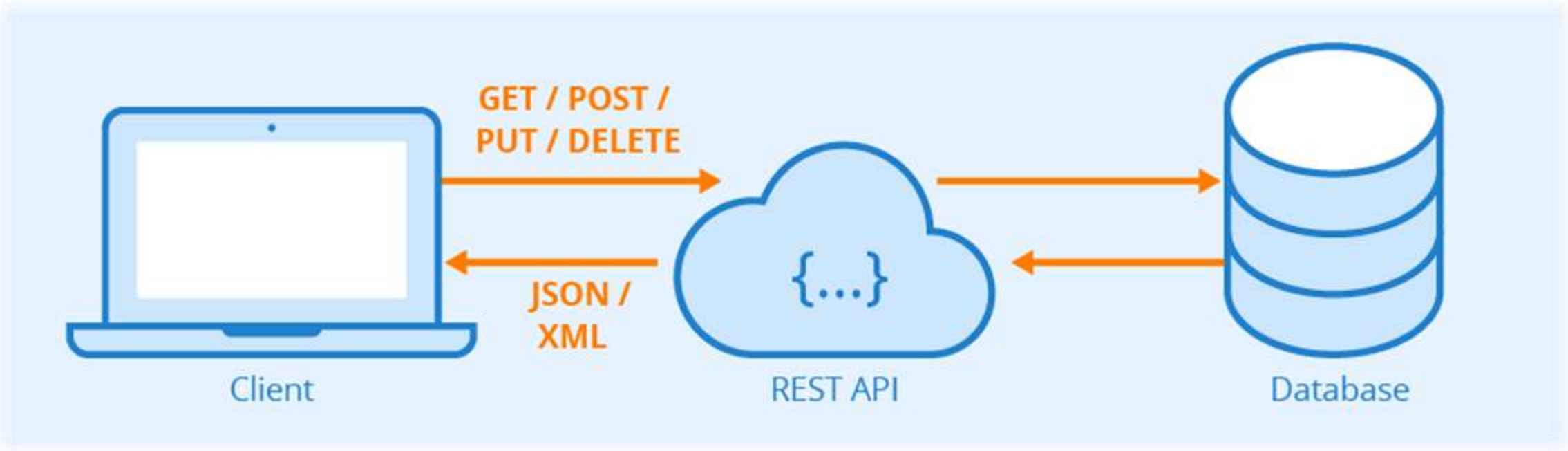
REST & REST API

REST & REST API

- **REST** (**Re**presentational **S**tate **T**ransfer) là các quy ước biểu diễn dữ liệu chuyển đổi giữa các ứng dụng.
- REST **API** (**A**pplication **P**rogramming **I**nterface) (còn gọi là REST**ful** API) là Web Service hoạt động theo các tiêu chuẩn:
  - Operations: **GET**, **POST**, **PUT**, **DELETE**...
  - Transfer Data: **JSON** or **XML**/HTML



REST API Communication Model



Operations

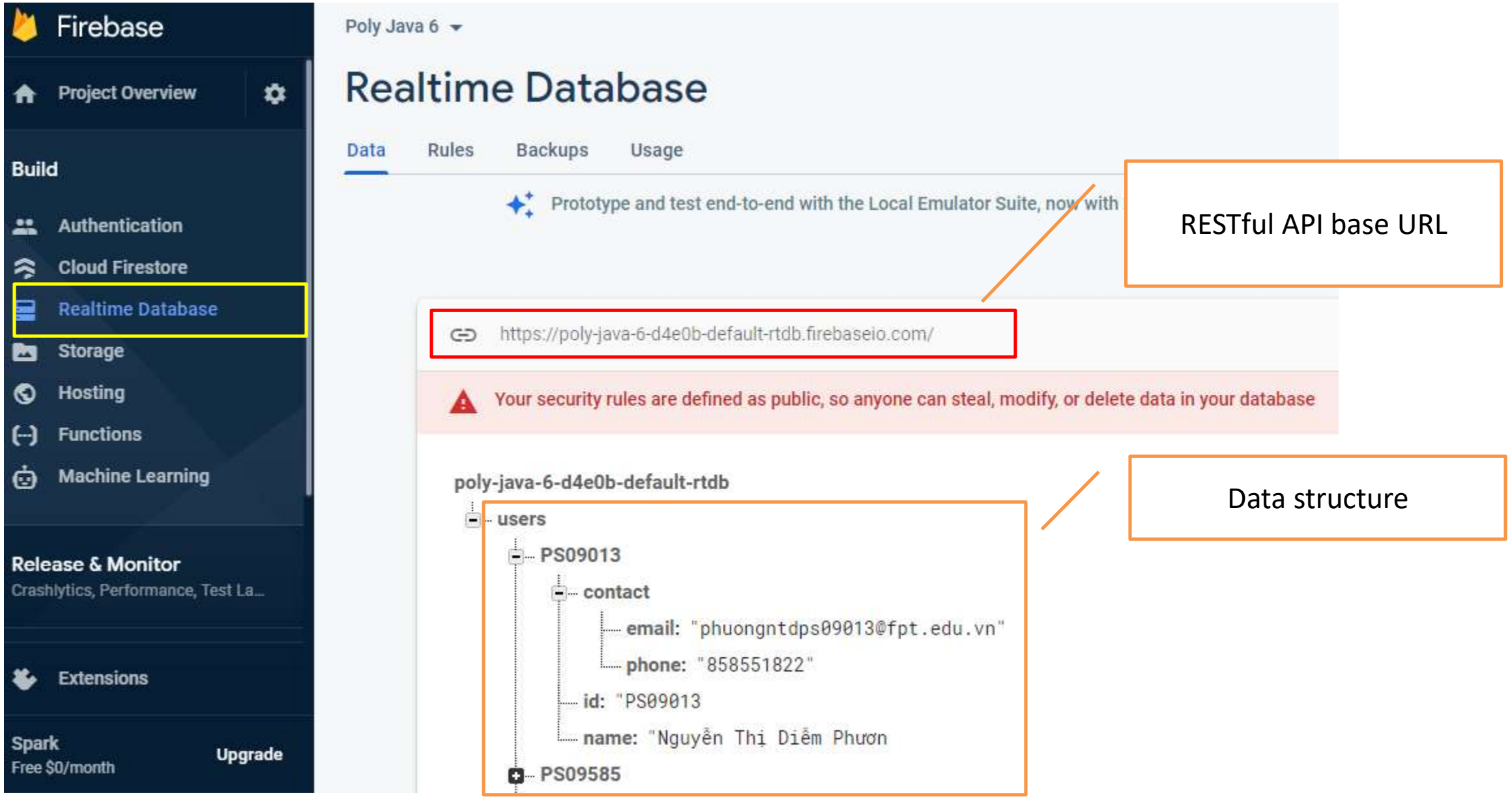
- GET: **(url) => response**
- POST: **(url, data) => response**
- PUT: **(url, data) => response**
- DELETE: **(url) => response (null)**

Transfer Data

- Dữ liệu trao đổi giữa Client và REST API là **JSON**/XML

Firebase REST API & Postman

FIREBASE REALTIME DATABSE



RESTful API base URL

Data structure

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FIREBASE REST API URLS

```
users: {
    "PS09013": {
        "id": "PS09013",
        "name": "Nguyễn Thị Diễm Phương",
        "contact": {
            "email": "phuongntdps09013@fpt.edu.vn",
            "phone": "858551822"
        }
    }
    ....
}
```

❑ EntryPoint URLs

https://poly-java-6-d4e0b-default-rtdb.firebaseio.com/

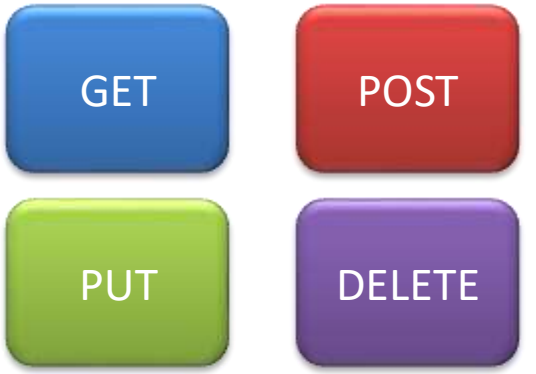
...users**.json => all users**

...users/PS09013.json **=> one user**

...users/PS09013/name.json **=> name**

...users/PS09013/contact.json **=> contact**

...users/PS09013/contact/email.json **=> email**



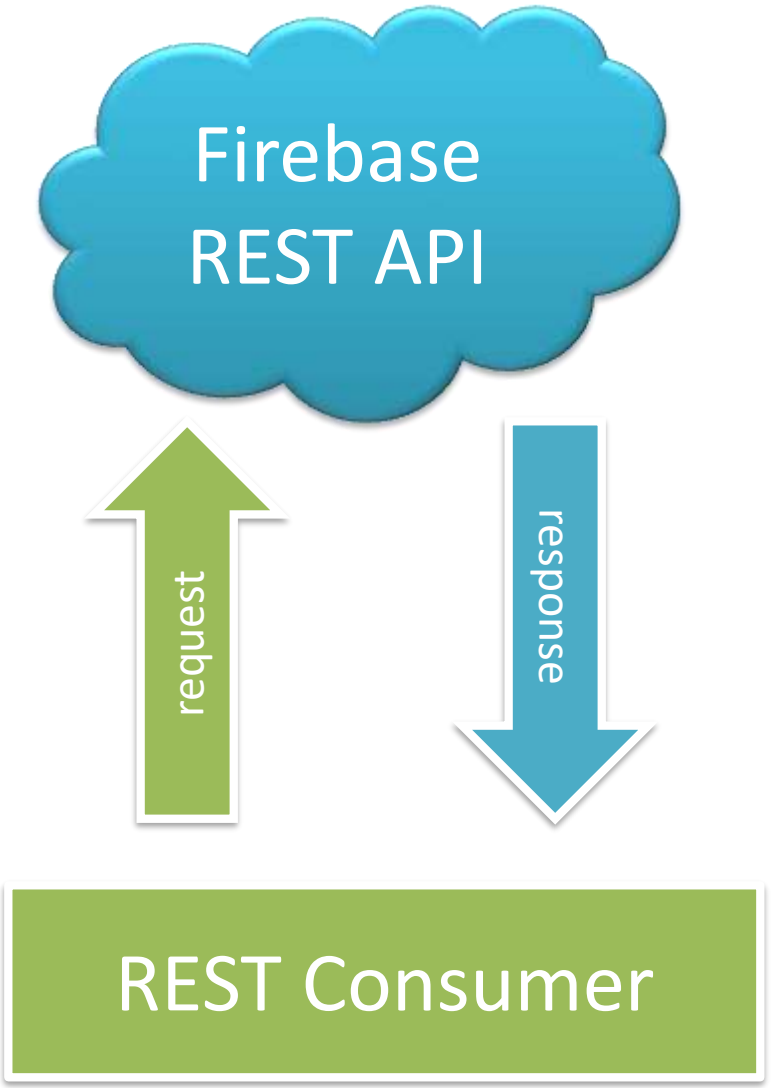
CONSUME FIREBASE REST API

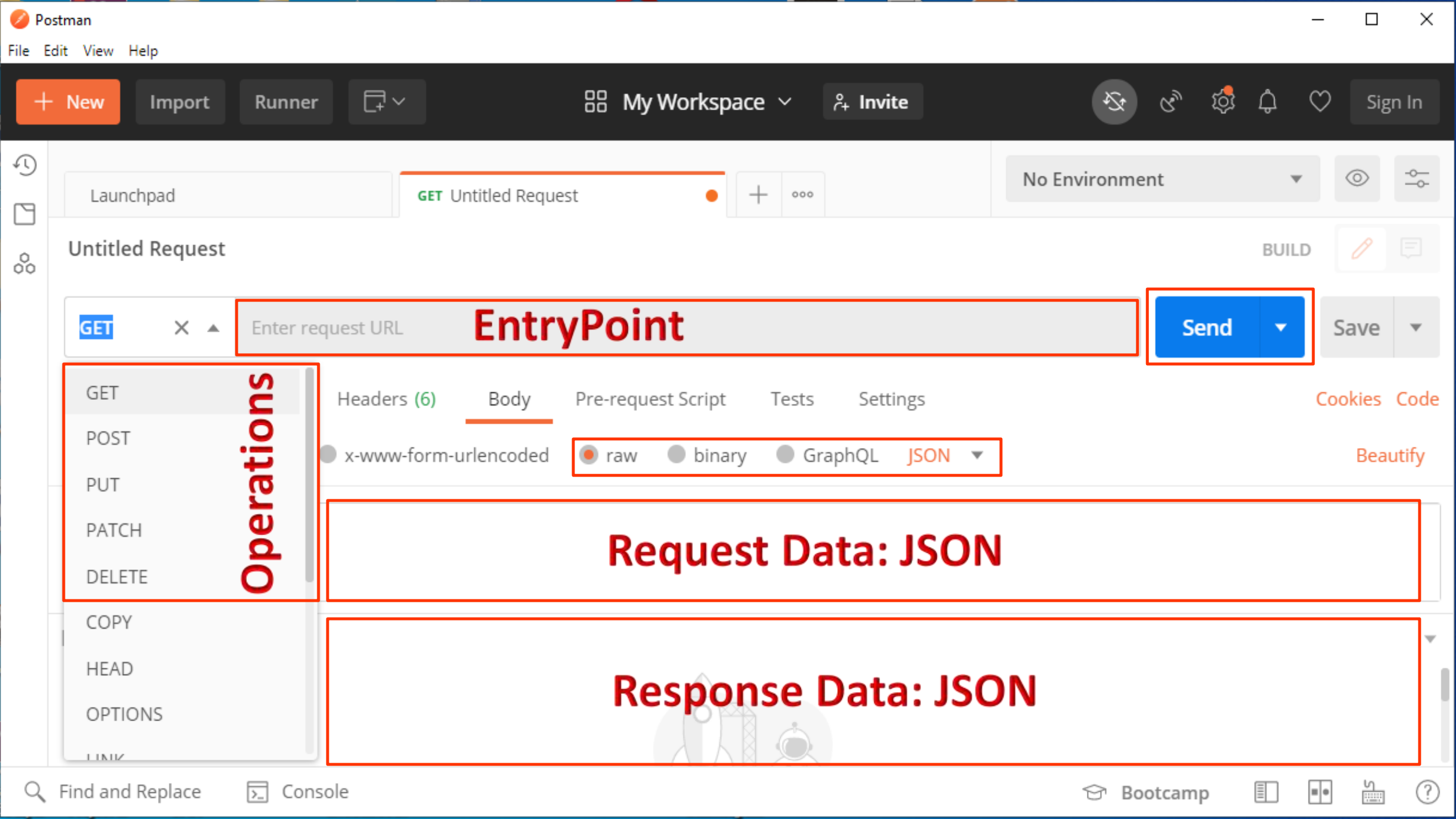
EntryPoint URL = "https://.../users/PS09013.json"

Data Structure = {

```
    "id": "?",
    "name": "?",
    "contact": {
        "email": "?",
        "phone": "?"
    }
}
```

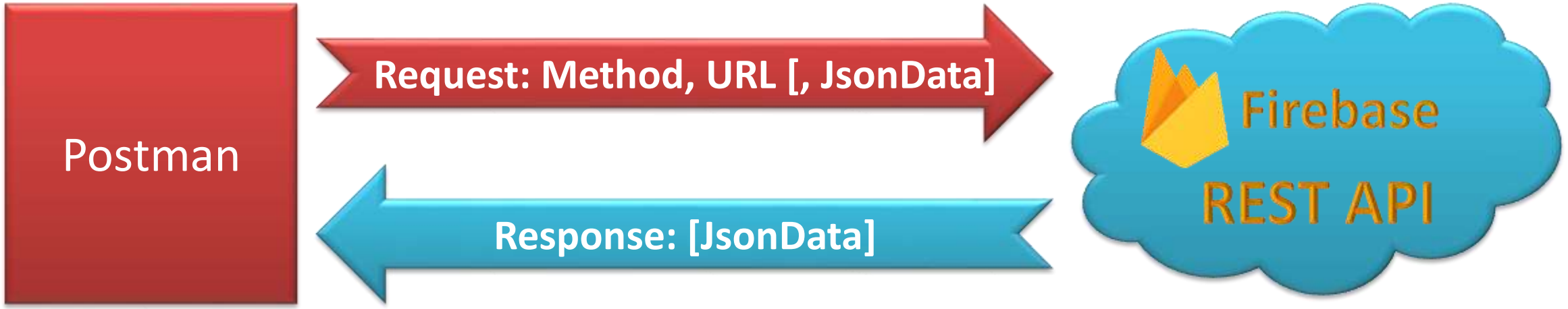
- Operations
  - **GET:** *request* (**url**) => *response* (**user**)
  - **POST:** *request* (**url, user**) => *response* (**key**)
  - **PUT:** *request* (**url, user**) => *response* (**user**)
  - **DELETE:** *request* (**url**) => *response* (**null**)



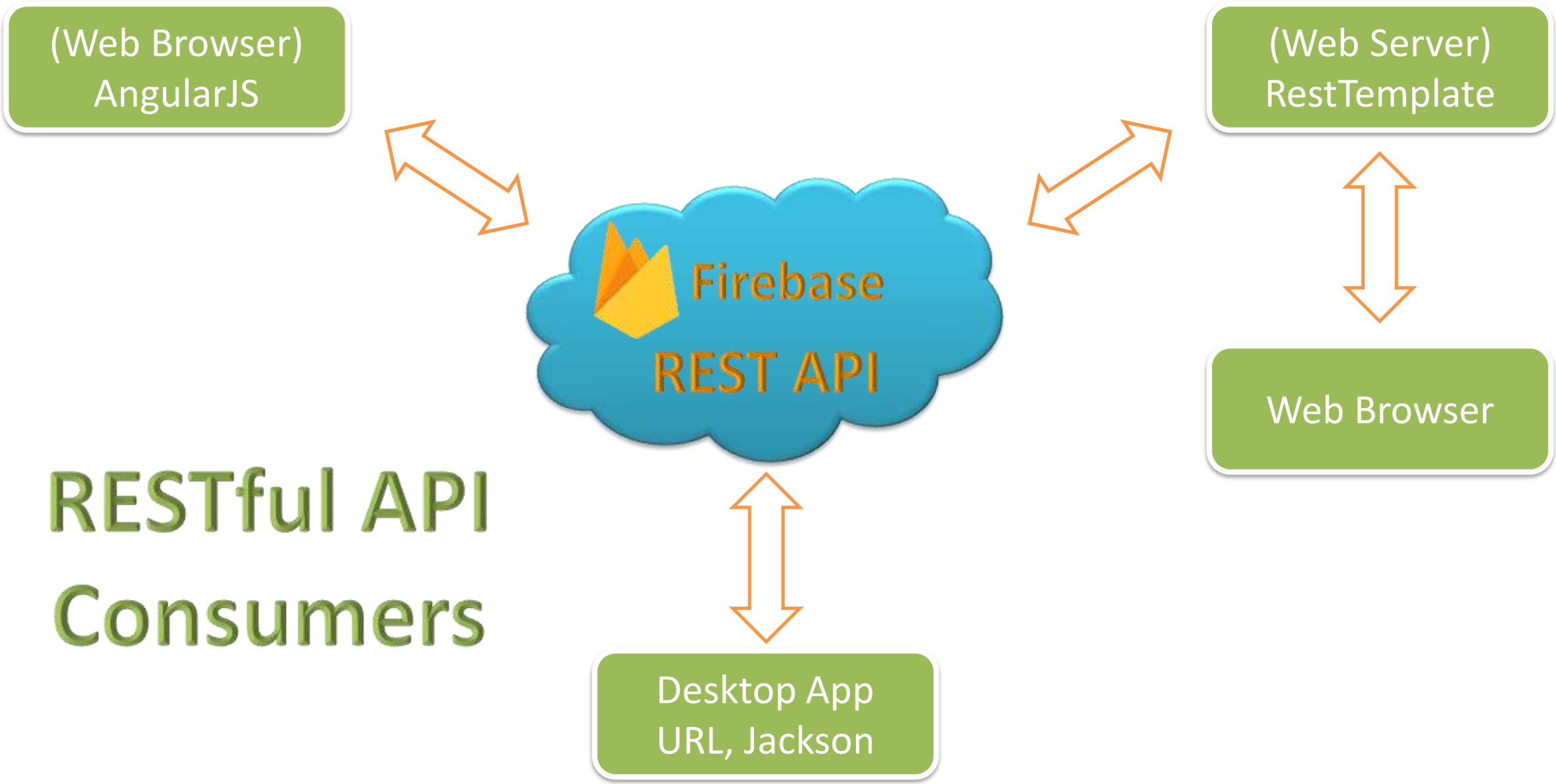

Postman
File Edit View Help
New
Import
Runner
My Workspace
Invite
Sign In
Launchpad
GET Untitled Request
No Environment
Untitled Request
BUILD
GET
Enter request URL
EntryPoint
Send
Save
GET
POST
PUT
PATCH
DELETE
Operations
COPY
HEAD
OPTIONS
Headers (6)
Body
Pre-request Script
Tests
Settings
Cookies
Code
x-www-form-urlencoded
raw
binary
GraphQL
JSON
Beautify
Request Data: JSON
Response Data: JSON
Find and Replace
Console
Bootcamp


DEMO

REST API Exchange Model



- Request:
  - Method: GET, POST, PUT, DELETE
  - URL: EntryPoint
  - JsonData: JSON
- Response:
  - JsonData: JSON


(Web Browser)
AngularJS
(Web Server)
RestTemplate
Firebase
REST API
Web Browser
RESTful API
Consumers
Desktop App
URL, Jackson

AngularJS $http Service

AngularJS $http Service API

- get().then().catch()

- post().then().catch()

- delete().then().catch()

- put().then().catch()

AngularJS $http Service

- REST API Operations
  - $http.**get**(url).***then***(response => {}).***catch***(error => {})
  - $http.**post**(url, data).***then***(response => {}).***catch***(error => {}))
  - $http.**put**(url, data).***then***(response => {}).***catch***(error => {}))
  - $http.**delete**(url).***then***(response => {}).***catch***(error => {}))
- Ví dụ

```
$http.get("…/users.json").then(response => {
    var users = response.data;
})
.catch(error => {
    console.log("Lỗi", error);
})
```

```
$http.get(".../users.json")
    .then(response => {
        console.log(response.data);
    })
    .catch(error => {
        console.log("Error", error);
    });
```

GET

```
$http.delete(".../users/TeoNV.json")
    .then(response => {
        console.log(response.data);
    })
    .catch(error => {
        console.log("Error", error);
    });
```

DELETE

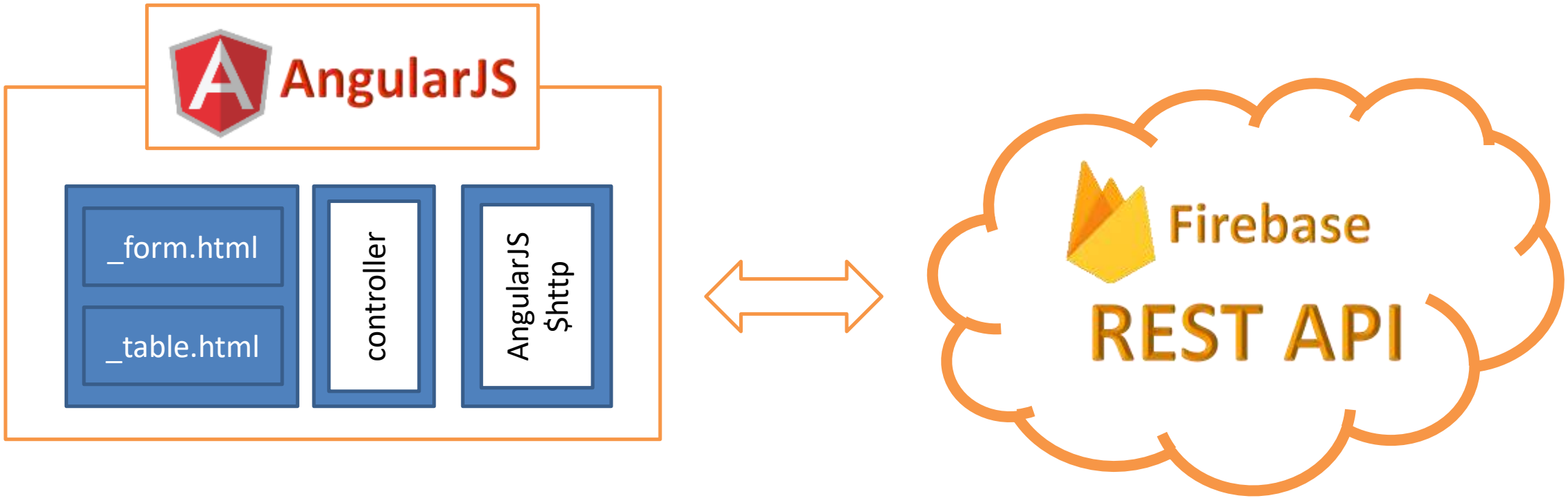
```
var data = {
    id: "TeoNV",
    name: "Nguyễn Văn Tèo"
}
$http.post(".../users.json", data)
    .then(response => {
        console.log(response.data);
    })
    .catch(error => {
        console.log("Error", error);
    });
```

POST

```
var data = {
    id: "TeoNV",
    name: "Nguyễn Văn Tèo"
}
$http.put(".../users/TeoNV.json", data)
    .then(response => {
        console.log(response.data);
    })
    .catch(error => {
        console.log("Error", error);
    });
```

PUT

AngularJS - Demo Application Model




DEMO

JAVA.NET.URL

```
String method = "GET" // POST, PUT, DELETE;
// 1. REQUEST
URL url = new URL("https://.....json");
HttpURLConnection conn = (HttpURLConnection) url.openConnection();
conn.setRequestProperty("Accept", "application/json");
conn.setRequestMethod(method);
```

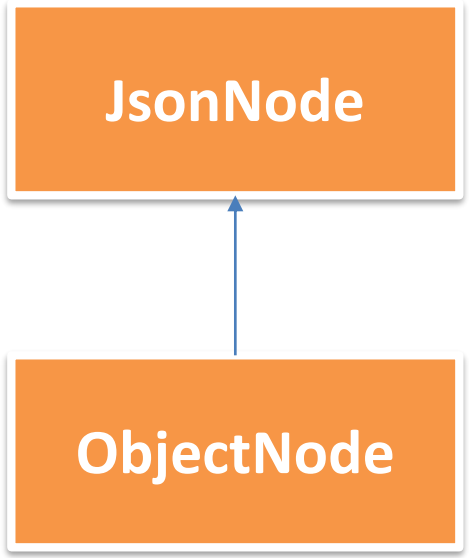
```
// 1.1 DATA (POST & PUT only)
if(method.equalsIgnoreCase("POST") || method.equalsIgnoreCase("PUT")) {
    NodeObject data = ...;
    conn.setDoOutput(true);
    mapper.writeValue(conn.getOutputStream(), data);
}
```

Jackson

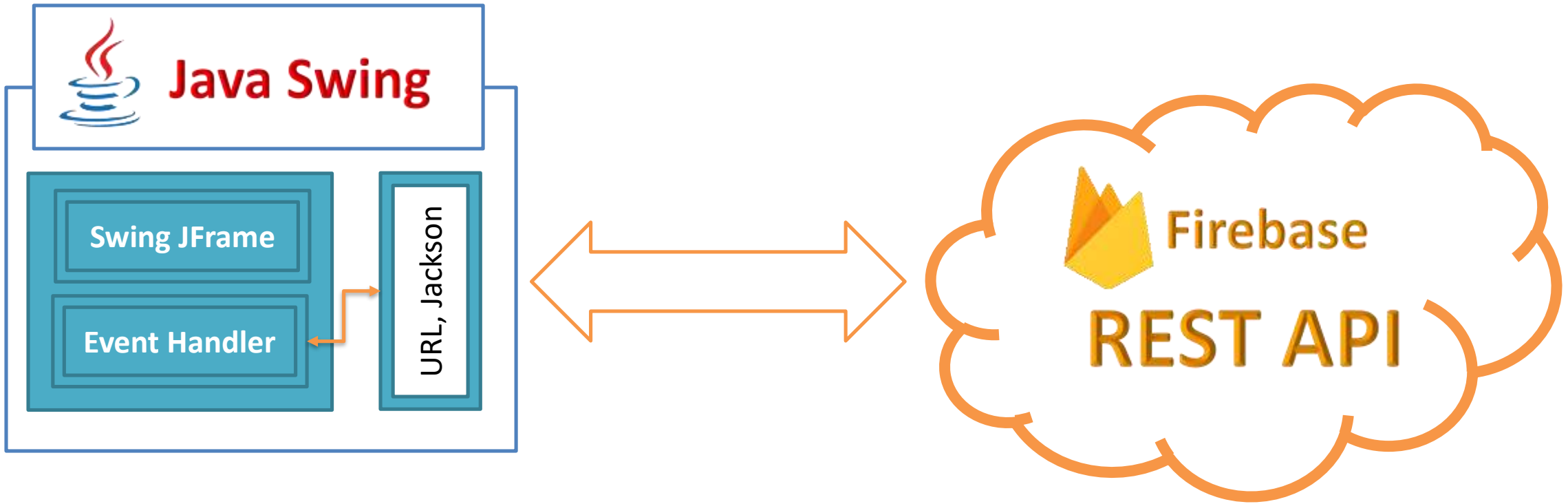
```
// 2. RESPONSE
int responseCode = conn.getResponseCode();
if (responseCode == 200) {
    JsonNode response = mapper.readTree(conn.getInputStream());
}
conn.disconnect();
```

JACKSON API

- ObjectMapper
  - readValue()
  - readTree()
  - writeValue()
  - writeValueAsString()
  - createObjectNode()
- JsonNode
  - get()
  - findValue()
  - asType()
  - iterator()
- ObjectNode
  - put()
  - putObject()
  - putArray()



Java Desktop Application – Demo Application Model



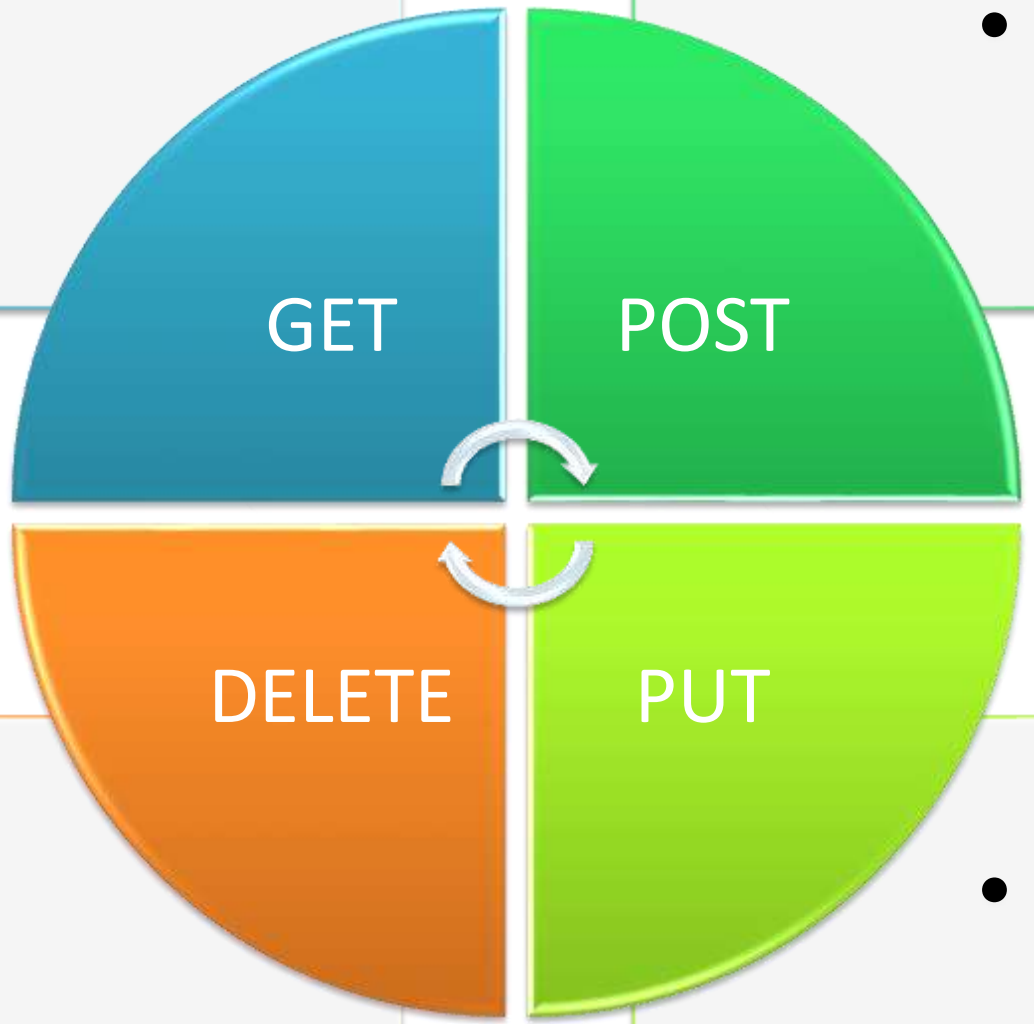

DEMO

Spring RestTemplate

RestTemplate API

- getForObject()

- postForObject()



- delete()

- put()

RestTemplate API

- RestTemplate: Thực hiện các REST Operations
  - **getForObject**(url, responseType<**T**>): **T**
  - **delete**(url)
  - **postForObject**(url, httpEntity, responseType<**T**>): **T**
  - **put**(url, httpEntity)
- HttpEntity<T>: Đóng gói dữ liệu json gửi đến REST API
  - new **HttpEntity<>(T)**

RestTemplate Programming Model

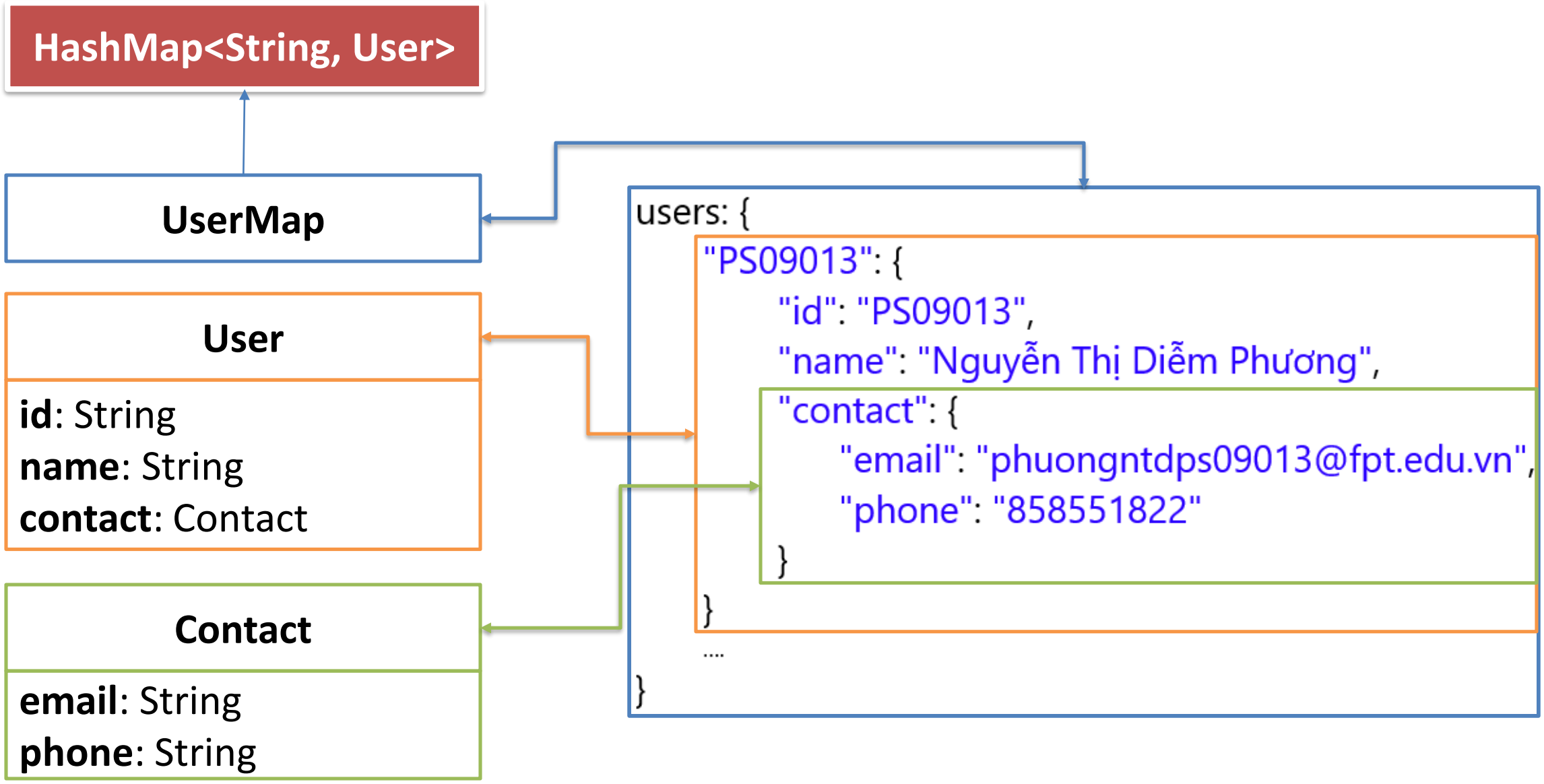
```
RestTemplate rest = new RestTemplate();
```

```
// GET
UserMap users = rest.getForObject("https://..../users.json", UserMap.class);
User user = rest.getForObject("https://..../users/key.json", User.class);
```

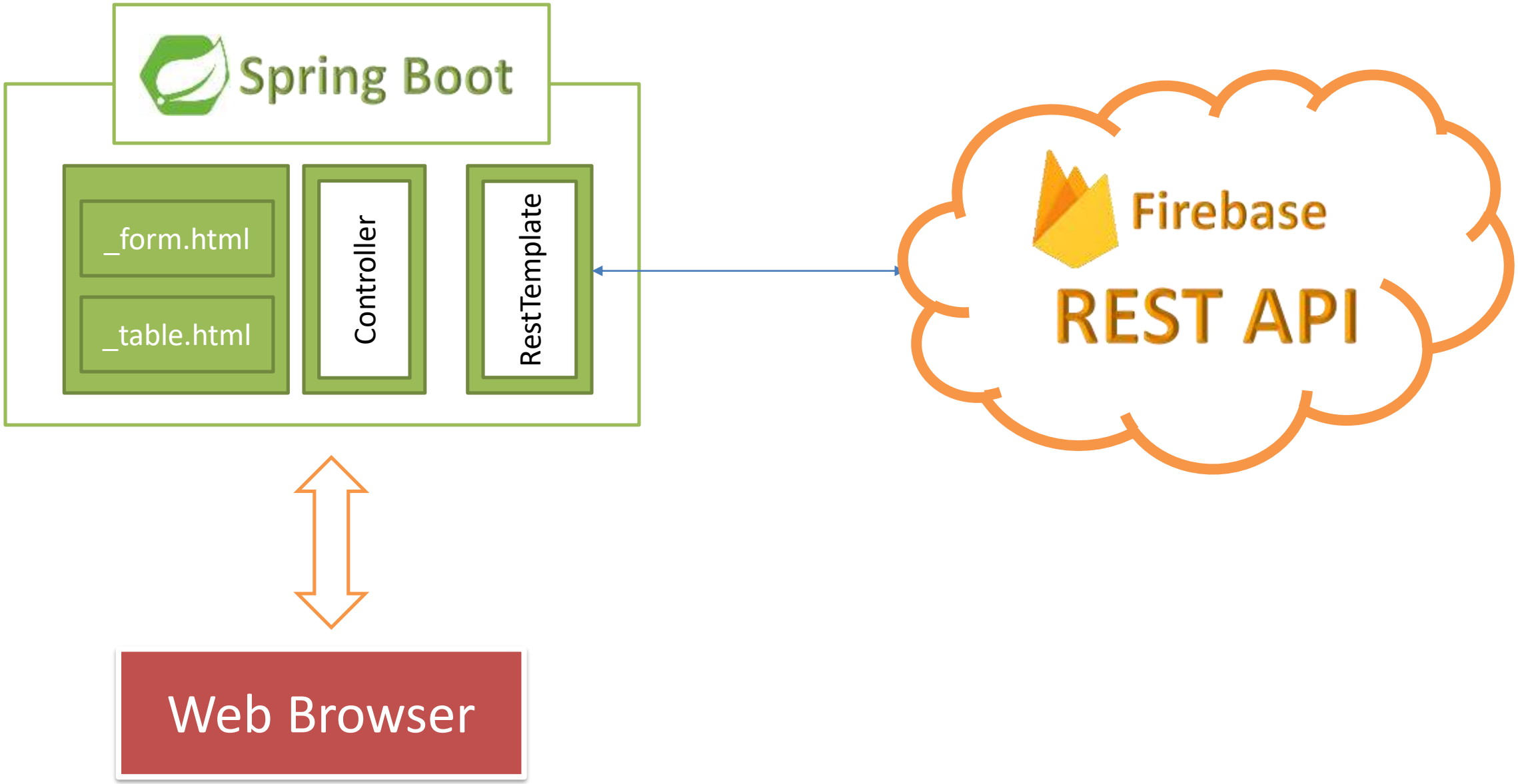
```
// DELETE
rest.delete("https://..../users/key.json");
```

```
// POST & PUT
User data = ...;
HttpEntity<User> request = new HttpEntity<>(data);
String key = rest.postForObject("https://..../users.json", request, String.class);
rest.put("https://..../users/key.json", request);
```

Entity Classes



Spring RestTemplate – Demo Application Model




{
[
}
]
DEMO

SUMMARY

- ☑ Web Service
- ☑ REST & REST API
- ☑ Firebase REST API & Postman
- ☑ Consume REST API with
  - ☑ AngularJS
  - ☑ Java.net.URL
  - ☑ RestTemplate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Thank you
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LUẬT KINH TẾ
KỸ THUẬT SOẠN THẢO VÀ TRÌNH BÀY VĂN BẢN